

## REMARKS/ARGUMENTS

Claims 1-2, 4-8, and 10-61 are pending in the present application, among which claims 19-43 currently stand withdrawn from further consideration.<sup>1</sup> Claims 1 and 46 are the only independent claims. Claim 1 has been amended to recite additional features in original claims 3 and 9, which have been cancelled without prejudice or disclaimer. Claim 6 has been amended to remove the informalities indicated in the Office Action without narrowing the scope of the claim or any elements contained therein. The claims have also been amended to conform to U.S. patent practice without narrowing any of the claims or any claim element contained therein. For example, claims 1 and 10 have been amended to recite “a distance (h2) between the patterned region and the active, radiation-generating layer,” as is disclosed in paragraphs [0047] and [0053] and shown in Fig. 1 of the published specification (*see*, US 2008/0035941).

New claims 44-61 have been added. Claim 44 is supported by original claim 1. Claims 45 and 47 are supported by paragraph [0006] of the published specification. Independent claim 46 contains features of original claims 1, 3, and 7. Claims 48 to 61 are supported by original claims 2, 4-5, 8-12, 14-18, and 41 and paragraph [0053] of the published specification.

Reconsideration of the subject application is respectfully requested.

### **Overview of the Office Action**

Claims 6, 9 and 15 have been rejected under 35 U.S.C. § 112, second paragraph.

Claims 1-5, 13 and 15-17 have been rejected under 35 U.S.C. § 102(b) as anticipated by US 6,291,839 to Lester.

Claims 6-12, 14 and 18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Lester.

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<sup>1</sup> The USPTO Restriction Requirement issued July 25, 2008 lists claims 1-41 in the Office Action Summary. Applicants submit that claims 1-43 were in fact pending at the time of the Restriction Requirement as a result of the Preliminary Amendment filed together with the new application. Claims 42 and 43 nevertheless do not read on the elected Species I and are thus withdrawn from further consideration.

Claim 8 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Lester in view of US 6,515,310 to Yamazaki.

Claims 1 and 3-18 have been provisionally rejected based on a non-statutory obviousness-type double-patenting as being unpatentable over claims 1-17 of co-pending application no. 10/523,551.

#### **Amendments Addressing Informalities**

Claim 6 has been amended to address the informalities raised in the Office Action. In view of such amendments to claim 6, the 35 U.S.C. § 112 rejection of claim 6 is believed to have been overcome.

Claim 9 has been cancelled without prejudice or disclaimer. The 35 U.S.C. § 112 rejection of claim 9 is thus moot.

Claim 15 and its base claim 1 have been amended to remove possible indefiniteness concerning the term "reflective layer." In view of such amendments, the 35 U.S.C. § 112 rejection of claim 15 is believed to have been overcome.

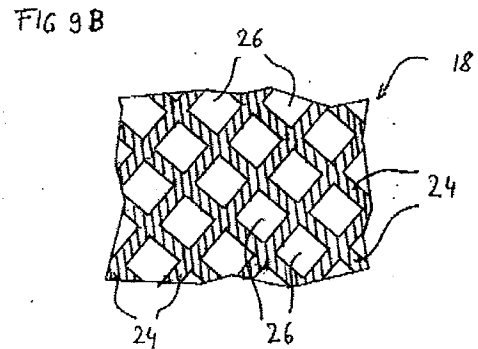
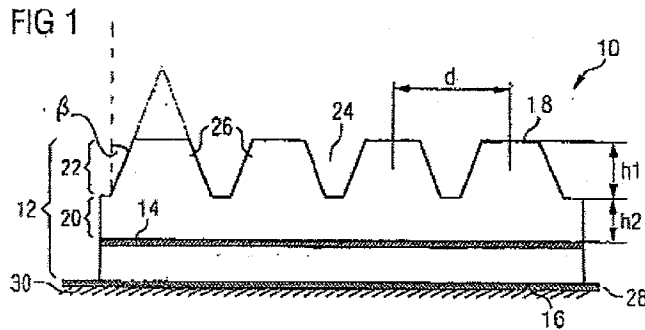
#### **Reply to Double Patenting Rejections**

With respect to the nonstatutory obviousness-type double-patenting rejection of claims 1 and 3-18, applicants reserve the right to file a terminal disclaimer in the future.

#### **Summary of the Subject Matter Disclosed in the Specification**

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The present specification describes a radiation-emitting thin-film semiconductor chip (10), as is generally shown Fig. 1 of the subject application (Fig. 1 is reproduced below for the Examiner's convenient reference):



The radiation-emitting thin-film semiconductor chip (10) comprises an epitaxial multilayer structure (12) and a reflective layer or interface (28). The epitaxial multilayer structure (12) comprises an active, radiation-generating layer (14), a first main face (16), and a second main face (18) remote from the first main face (16) for coupling out radiation generated in the active, radiation-generating layer (14). The first main face (16) of the multilayer structure (12) is coupled to the reflective layer or interface (28).

The multilayer structure (12) also has a patterned region (22) that adjoins the second main face (18) of the multilayer structure (12). The patterned region (22) comprises convex elevations (26) defined by either one- or two-dimensional depressions (24) (see, Fig. 9B above). In one embodiment, the convex elevations (26) have a height (h1) at least as large as a distance (h2) between the patterned region (22) and the active, radiation-generating layer (14).

## Patentability of the Claimed Invention

### A. Independent Claim 1 is Not Anticipated by Lester

Independent claim 1 recites "a region of the multilayer structure that adjoins the second main face of the multilayer structure is patterned by one- or two-dimensional depressions forming convex elevations." As is shown in Figs. 9A and 9B, the resultant convex elevations

(26) are each defined by one or more depressions (24), which extend in either one or two coordinate directions (*see*, also page 6 of Preliminary Amendment). The above recited claim features of independent claim 1 are not taught by Lester.

When rejecting claim 3, which has now been incorporated in independent claim 1, the Office Action takes the position that the p-type layer 16 shown in Fig. 5 of Lester has convex elevations. Applicants disagree.

Fig. 5 of Lester shows the cross-section of one embodiment of Lester's light emitting device (LED). Concerning this embodiment, Lester teaches that the top surface of the LED is roughened, preferably in alignment with the openings in the contact 20 (*see*, Fig. 1). For example, the roughened surface can be achieved by etching the GaN during the same lithographic step used to pattern the contact 20. The etched holes can extend into the p-layer 16. *See*, col. 5, ll. 8-14 of Lester.

In view of the above teachings of Lester, one skilled in the art will understand Fig. 5 of Lester as illustrating the etched holes extending into the p-layer 16. If such etched holes were viewed in a top down direction with the contact 20 removed, they are likely to resemble a pattern similar to the finely spaced pattern of openings in the contact 20, as shown in Fig. 1 and disclosed in column 3, lines 1-3 of Lester. Accordingly, the p-type layer 16 in Lester is merely a single-piece layer with multiple etched holes therein. Therefore, Lester does not disclose "convex elevations" formed by "one- or two-dimensional depressions," as is recited in independent claim 1.

Independent claim 1, therefore, patentably distinguishes over Lester for at least the above reasons. Withdrawal of the 35 U.S.C. § 102(b) rejection of independent claim 1 is respectfully requested.

## B. Independent Claim 1 is Not Obvious Over Lester

Independent claim 1 also recites “the convex elevations having a height (h1) at least as large as a distance (h2) between the patterned region and the active, radiation-generating layer,” as recited in original claim 9, which has been cancelled without prejudice or disclaimer.

When rejecting claim 9, the Office Action takes the position that it would have been obvious to one skilled in the art to modify Lester to arrive at the claimed invention as “discovering an optimum value of a result effective variable involves only routine skilled in the art” (*see*, pages 5 and 6 of the Office Action). Applicants disagree.

The Manual of Patent Examining Procedure (MPEP) requires that:

A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result-effective variable.). (*See*, MPEP § 2144.05. Emphasis added.)

In this case, Lester teaches the correlation between the (lateral) dimension of openings in the p-layer 16 and the thickness of the p-layer 16 as a result of current spreading in the p-type layer 16 (*see*, col. 3, ll. 11-30 of Lester). Lester however is silent about the relative heights of the etched holes in the p-type layer 16 and of the remaining p-typed layer 16, much less teaching or recognizing that the relationship of such heights can affect the coupling-out efficiency of the LED. It is the applicants of the subject application who recognized the effect of the relative heights (h1, h2) of the respective patterned and non-patterned regions (22, 20) on the coupling-out efficiency of the LED, as is disclosed in paragraphs [0053] and [0054] and shown in Fig. 3B of the published application. Therefore, the position taken by the Office Action is not sustainable.

In view of the above, independent claim 1 patentably distinguishes over Lester, in addition to the reasons submitted above. Withdrawal of the 35 U.S.C. § 103(a) rejection of independent claim 1 is respectfully requested.

C. New Independent Claim 46

Similar to independent claim 1, new independent claim 46 recites “a region of the multilayer structure that adjoins the second main face of the multilayer structure is patterned by either one- or two-dimensional depressions forming convex elevations.” Accordingly, new independent claim 46 is allowable for at least the same reasons submitted in connection with independent claim 1 under the above sub-section A.

Moreover, new independent claim 46 recites “the convex elevations having an inclination angle ( $\beta$ ) of between approximately 30° and approximately 70°,” as is recited in claim 7. Because Lester fails to teach or recognize the effect of such inclination angle ( $\beta$ ) on the coupling-out efficiency of the LED, new independent claim 46 is not obvious over Lester. Accordingly, new independent claim 46 is allowable for the above additional reasons.

D. Dependent Claims 2, 4-8, 10-18, 41, 44-45, and 47-61

Claim 41, depending from independent claim 1, has been inadvertently omitted from the elected claims with respect to the Group I invention and hence has been withdrawn from consideration. Applicants respectfully request that claim 41 be considered together with the claims 2, 4-8, 10-18, 44-45, and 47-61 in the next Office Action.

Claims 2, 4-8, 10-18, 41, 44-45, and 47-61 depend, directly or indirectly, from allowable independent claim 1 or 46. Yamazaki was cited in the Office Action against the additional features in claim 8 but does not remedy the deficiencies of Lester. Therefore, claims 2, 4-8, 10-18, 41, 44-45, and 47-61 are each allowable for at least the same reasons that independent claim 1 or 46 is allowable.

In addition, claims 2, 4-8, 10-18, 41, 44-45, and 47-61 include features which serve to even more clearly distinguish the present invention over the prior art of record. For example, claims 45 and 47 each recite that "the semiconductor chip is free of a growth substrate of the epitaxial multilayer structure," which are not taught by either Lester or Yamazaki. Therefore, claims 45 and 47 are allowable for the above additional reasons.

### **Conclusion**

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited. Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

No fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our PTO Deposit Account No. 03-2412.

Respectfully submitted,  
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